

5 **Claims**

10 1. A method for eliminating detrimental substances in a process liquid, having a first pH and, in addition to said detrimental substances, comprising metal ions and suspended material, wherein carbon dioxide is added to the process liquid in order to bring the process liquid to a second pH, lower than the first pH, characterized in that the metal ions comprise hydroxide builders, and that the carbon dioxide (CO_2) is added in an amount which causes the second pH to be between 8 and 6.5, so that the carbon dioxide primarily forms bicarbonate ions (HCO_3^-) having a pH-buffering effect and the metal ions primarily form metal hydroxides, whereafter the detrimental substances coagulate or agglomerate with the metal hydroxides and are adhered to the suspended material so that they become inactive.

20 2. A method according to claim 1, characterized in that the suspended material with the detrimental substances adhered thereto is subsequently removed from the process liquid.

25 3. A method according to claim 1 or 2, characterized in that the carbon dioxide is added in an amount which causes the second pH to be between 7 and 7.5.

30 4. A method according to claim 1, 2 or 3, characterized in that the detrimental substances comprise dissolved or suspended organic material or synthetic, organic material, such as wood resin, fibre fines, biological polymers or latex.

5. A method according to any one of the preceding claims,
characterized in that the detrimental substances comprise dissolved or suspended
inorganic material, originating from Ca, P, Si, Mg, Mn, Fe, Cu, Al, Zn, Si or K.

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6. A method according to any one of the preceding claims,
characterized in that the process liquid is fresh water, a process liquor in a pulp
manufacturing process, a process water in a paper manufacturing process, a liquid for the
preparation of a paper coating composition, or waste water.

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7. A method according to any one of the preceding claims,
characterized in that the metal ions comprise Al^{3+} , Fe^{3+} , Fe^{2+} , Zn^{2+} , Cu^{2+} or a
combination of these.

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8. A method according to any one of the preceding claims,
characterized in that the suspended material comprises cellulose fibres, kaolin
particles or active sludge.

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9. A method according to any one of the preceding claims,
characterized in that the suspended material with the thereto fixed metal ions and
detrimental substances is used for paper manufacturing or is incinerated with heat
recovery.

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10. A method according to any one of the preceding claims,
characterized in that the brightness of the suspended material, measured
according to SCAN-P3:93, is stabilized or raised by means of the method.

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11. A method according to any one of claims 1 - 10, wherein the suspended material
comprises wood-containing pulp fibres which are subjected to a lignin-preserving
bleaching in at least one bleaching stage and thereafter are stored in a storage tank during
a retention time, characterized in that the carbon dioxide is added upstream or in

the storage tank, so that the brightness loss of the wood-containing pulp fibres, measured according to SCAN-P3:93, is less than 3 ISO%-units during the retention time.

12. A method according to any one of claims 1 - 10, wherein the suspended material originates from paper broke coated with a coating composition, and said paper broke after desintegration is stored in a paper broke tank during a storage time before being brought to a paper machine, characterized in that the carbon dioxide is added upstream or in the paper broke tank, so that the brightness of the wood-containing pulp fibres, measured according to SCAN-P3:93, is raised by at least 1 ISO%-units during the storage time.

13. A method according to any one of claims 1 - 9, wherein the suspended material comprises kaolin particles suspended in the process liquid comprising a sodium hydroxide liquor, characterized in that the detrimental substances comprise at least phosphorus (P), wherein the carbon dioxide is added to the process liquid, so that the suspended material obtains improved dewatering and a higher metal content, and the process liquid obtains a lower metal content.

14. A method according to any one of claims 1 - 10, wherein the suspended material comprises pulp fibres from recycled waste paper suspended in the process liquid comprising water, and the suspended material is subjected to a lignin-preserving bleaching, characterized in that the detrimental substances at least comprise synthetic organic material, wherein the carbon dioxide is added to the process liquid before the bleaching, so that the synthetic organic material is fixed onto the suspended material.

15. A method according to any one of claims 1 - 10, wherein the suspended material comprises pulp fibres of mechanical pulp suspended in the process liquid comprising water with an addition of sodium hydroxide, and the suspended material is subjected to a lignin-preserving bleaching with hydrogen peroxide (H_2O_2) and thereafter is brought to a paper machine after an intermediate storage time, characterized in that the detrimental substances at least comprise dissolved organic material and residual peroxide-destroying

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metal ions, wherein the carbon dioxide is added to the process liquid before the intermediate storage time, so that the sodium hydroxide (NaOH) is converted to sodium bicarbonate (NaHCO_3) and the residual peroxide-destroying metal ions and the dissolved organic material is fixed onto the suspended material.

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16. A method according to any one of claims 1 - 9, wherein the suspended material comprises active sludge suspended in the process liquid comprising waste water, and the suspended material is subjected to a dewatering, characterized in that the detrimental substances at least comprise dissolved organic material, such as biological polymers originating from the active sludge, wherein the carbon dioxide is added to the process liquid before the dewatering, so that the the dissolved organic material is fixed onto the suspended material and the dewatering is facilitated.

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17. A method according to any one of claims 1 - 10, wherein the suspended material comprises pulp fibres suspended in the process liquid comprising water with high temporary hardness, and the pulp fibres are formed to a paper sheet in a paper machine at a process liquid temperature lower than $+ 40^\circ\text{C}$, characterized in that the detrimental substances at least comprise dissolved calcium bicarbonate, wherein the carbon dioxide (CO_2) is added to the process liquid before the paper machine so that the dissolved calcium bicarbonate ($\text{Ca}(\text{HCO}_3)_2$) is converted to calcium carbonate (CaCO_3) which is fixed onto the suspended material.

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